

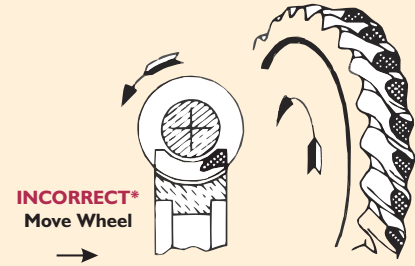
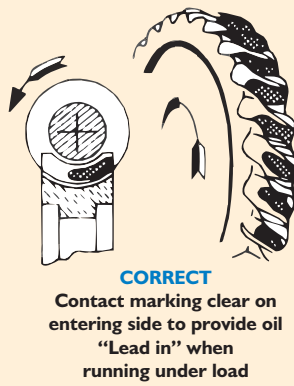
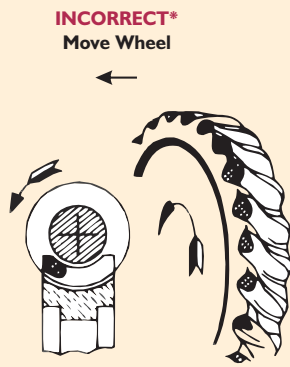


**PREMIUM**

# GREAVES WORM SPEED REDUCERS

**Installation and Maintenance**





\*Incorrect wheel assembly will lead to premature wearing of worm wheel

## Axial Floats >>

After assembling it is essential that shaft end floats be correctly set. The following axial floats for wormshaft and wheelshaft are recommended. However it is better to maintain axial float at lower recommended value. They should be checked preferably

Size	Wormshaft (mm)	Wheelshaft (mm)
112	0.025/0.075	0.025/0.050
162	0.025/0.075	0.025/0.050
200	0.025/0.075	0.025/0.050
237	0.025/0.075	0.025/0.050
287	0.025/0.075	0.025/0.050
337	0.025/0.075	0.025/0.050
400	0.050/0.100	0.025/0.050
500	0.050/0.100	0.025/0.050
600	0.050/0.100	0.025/0.050
700	0.050/0.100	0.025/0.075
800	0.050/0.100	0.025/0.075
1000	0.050/0.100	0.025/0.075
1200	0.075/0.125	0.050/0.100
1400	0.075/0.125	0.050/0.100

## Lubrication >>

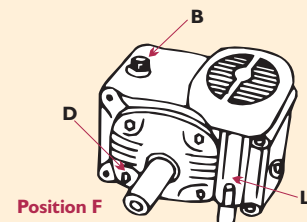
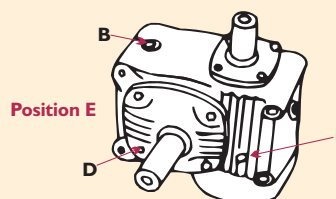
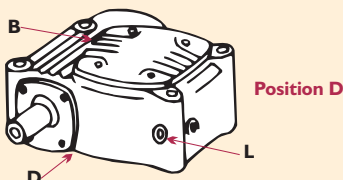
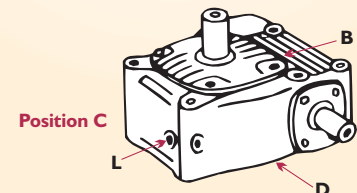
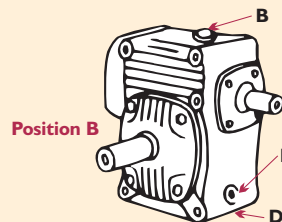
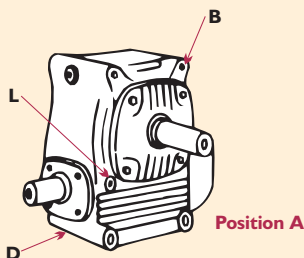
The Greaves Speed Reducer lubrication system is self contained positive and automatic at all speeds of operation and in either direction of rotation. Adaptable units are provided with breather, oil level and drain plugs and it must be ensured that these are correctly positioned as shown on the accompanying diagram. Other units incorporate a dipstick for oil level checking, an oil filler-cum-ventilator and drain plugs. Their locations are shown on the following page.

Greaves Speed Reducer units are supplied without oil and must be filled Greaves Traxol lubricant to the correct level. It is important to ensure that the correct oil level is not exceeded as over filling causes oil churning, resulting in

### CAUTION

Vertical gearboxes have dry well arrangement on the output line. Please fill oil in between marks 'L' and 'H' of dipstick. Excess oil filled beyond level 'H' may lead to leakage of oil through output seal.

Use only  
**GREAVES  
TRAXOL  
- G32**



## Effect of Temperature >>

Any change in temperature will alter the height of a shaft above its foundations. If there is much difference between the temperature of a gear casing and that of the driven machine, or prime mover, the resulting difference in level may be appreciable. The coefficient of linear expansion of cast iron is 0.000011 mm per mm per °C; hence with a centre height of 500mm above the

bedplate and difference in temperature of 30°C between the gear casing and the machine, the error of alignment, if correct when cold, will be 0.165mm.

Such conditions may, particularly in the case of large units and those which are close-coupled, impose very severe loads on the bearings. If this is so, it is recommended that an allowance be made so that the

## Lining Up >>

Errors of alignment fall into the categories of angularity (Fig. 1) and eccentricity (Fig. 2), or combinations of both. Angularity error should be corrected first by using feeler gauges (Fig. 3) and arriving at a constant gap measured every 90° of rotation, rotating both halves simultaneously. Eccentricity error can be corrected by using a straight edge (Fig. 4) if both couplings have the same outside diameter. If not a straight edge should be used in conjunction with a feeler gauge equal to half the difference in

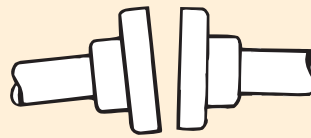


Fig. 1 >

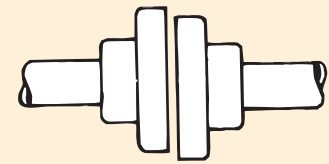
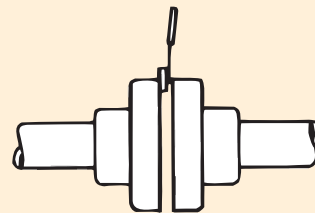
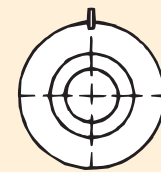
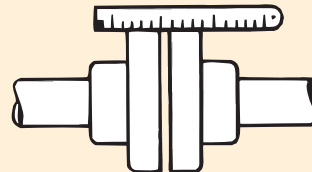


Fig. 2 >



<< Fig. 3

Fig. 4 >>



## Changing Handing >>

When changing the handing of the slow speed shaft extension, the shaft complete with wormwheel, bearings etc. should be reversed as a unit. It should be appreciated that this has the effect of reversing the offset of the wheel relative to the worm. When changing the slow speed shaft handing of V type units it should be noted that the position of the wheel relative to the case must not be changed; it is necessary therefore to press the wheel from the shaft. The position of the shaft in relation to the wormwheel must be reversed. The end covers should be located in their respective positions. It is necessary to check contact markings on the wormwheel teeth and if any axial adjustment of the wormwheel is necessary, it can be effected by means of the shims between end covers and bearing housing which should be moved from one side to the other. It is essential that the top half of the gear case be replaced in its original position.

The contact marking is checked by painting the worm with red lead or Prussian Blue and rotating the worm by hand while applying a small braking pressure to the wheel, also by hand.

The correct marking should be slightly heavier on the "leaving side" of the teeth, relative to the direction of rotation of the worm, so as to provide "lead in" for the lubricant and to avoid concentration of pressure on the entering side as this would affect the smoothness of operation. This arrangement is shown in the diagrams. When the correct wheel setting has been reached on the U type speed reducers, the oil scraper clearance relative to the wormwheel should be set at 0.25 mm to 0.38 mm.

If gearbox is dismantled for maintenance, while re-assembling care should be taken to gently scrape the joint faces and apply 'LOCTITE FLANGE SEALANT

# GREAVES WORM SPEED REDUCERS

## Installation and Maintenance

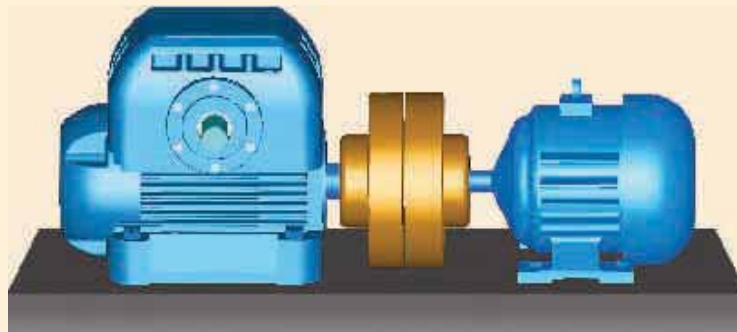
### General >>

The Greaves Speed Reducer is a precision product incorporating the very best in worm gear design. It is a self-contained unit of simple rigid construction involving the minimum number of moving parts and embodying a lubrication system which ensures a positive supply of oil to gears and bearings at all running speeds. With careful

installation Greaves Speed Reducers will give complete reliability in service and the only attention necessary is an occasional oil level check.

This publication gives information on correct installation, thus ensuring that the high initial efficiency is unimpaired in operation.

### Installation >>



It is preferable, although not essential, to mount the gear unit and prime mover on a common bedplate. Any foundation used should be rigid so as to minimise the effect of fluctuating or heavy loads. When lowering a bedplate on to its foundation flat steel packings should be used, placed on either side and as close as possible to each foundation bolt. Packings should also be placed in such a position that support is given in the

plane of the coupling faces. Care must be taken so as not to spring the bedplate when the final bolting down is carried out after the unit and prime mover have been lined up, as strains may be set up in the gear casing and errors of alignment in shafts and gears may be introduced. It is advisable to check the alignment after bolting down, even when a gear unit and motor have been assembled and lined up on a bedplate.

### Allowance For Bearing Clearance >>

Where a Greaves Speed Reducer with shafts mounted on ball or roller bearings, is coupled to a prime mover or a driven machine with plain bearings, an allowance for "lift" should be made to accommodate the probable change in centre height when running, due

to thickness of the oil film and upward reaction (if any) under load.

No hard and fast rule can be given as to the exact amount of correction to allow and this, dependent upon so many

## Maintenance >>

### (1) WEEKLY INSPECTION

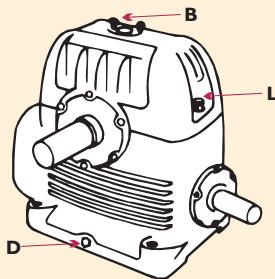
- Check the oil level by means of the dipstick or oil level plug and if necessary, top up with the recommended grade of lubricant.
- Ensure that breathers are cleaned regularly. Care must be taken not to paint over the breathers, otherwise pressure will build up, resulting in oil leakage.
- On units having grease lubricated bearings, add two shots of grease from a grease gun, or where screw-in type

### (2) OIL CHANGES

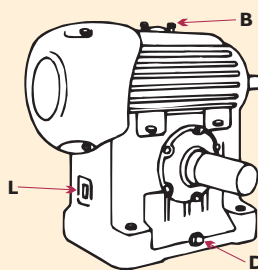
Regular oil changes are essential to ensure that the unit gives long and trouble-free service. The frequency at which the oil should be changed is determined by the following factors :

- Oil temperature—unit operating under load
- Type of oil—plain or containing additives
- Environment—humidity, dust etc.
- Operating conditions—shock loading etc.

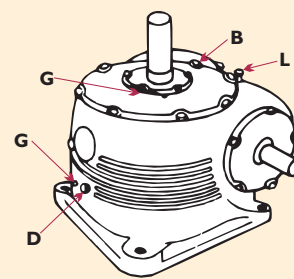
At elevated temperatures the effective life of the oil is very much reduced. This is most pronounced with oil containing fatty and E.P. additives. To prevent unit damage through lubricant



Type U 400-1700



Type O 400-1400



Type V 400-1700

### Using Plain Mineral Oil

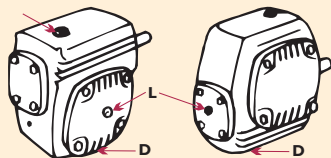
Temp. °C	Adaptables	Other Units
75 or less months	2500 hr. or 6 months	5000 hr. or 12
80	2000 hr. or 6 months	3500 hr. or 6 months
85	1500 hr. or 3 months	2500 hr. or 6 months
90	1000 hr. or 3 months	1000 hr. or 3 months

### Using Oils Containing Additives

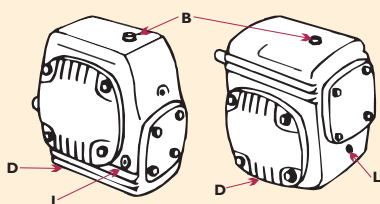
Temp. °C	Adaptables	Other Units
75 or less months	2500 hr. or 6 months	5000 hr. or 12
80	1500 hr. or 6 months	3000 hr. or 6 months
85	1000 hr. or 3 months	2000 hr. or 6 months
90	750 hr. or 3 months	750 hr. or 3 months

Note : Figures quoted in the table are for oil temperatures when the unit has attained normal running temperature when operating under load. These figures are based on normal running but where conditions are particularly severe it may be necessary

#### Primary Units on type AUD, AOD, AVD Units Sizes 162-337



#### Primary Units on type UD and VD Units Sizes 400 - 1700 and on types OD Sizes 400 - 1400



Dipstick as fitted on units  
size 1000 and above



B - Breather/Filler plug  
L - Oil level Plug/dipstick  
D - Drain plug  
G - Grease lubricator

## OIL CAPACITIES FOR FIRST FILLING (in litres)

**Adaptable Units**
**SINGLE REDUCTION UNITS**

SIZE	112	162	200	237	287	337

**Types U, O, V**

SIZE	400	500	600	700	800	1000	1200	1400	1700
<b>U</b>	3.0	4.3	6.3	9.1	11.4	17.5	23.0	37.0	45.0
<b>O</b>	2.3	2.8	4.0	5.7	9.1	11.0	15.0	24.0	--

**Types AD**
**DOUBLE REDUCTION UNITS**

SIZE	UNIT	162	200	237	287	337
<b>AUD</b>	<b>Primary Unit</b>	0.1	0.1	0.3	0.3	0.3
<b>AOD</b>						

**Types UD, OD, VD**

SIZE	UNIT	400	500	600	700	800	1000	1200	1400	
<b>1700</b>										
<b>UD</b>	<b>Primary Unit</b>	0.6	0.6	1.1	1.7	2.8	4.0	5.7	9.1	11.4
	<b>Secondary Unit</b>	3.0	4.3	6.3	9.1	11.4	17.5	23.0	37.0	45.0
<b>OD</b>	<b>Primary Unit</b>	0.6	0.6	1.1	1.7	2.8	4.0	5.7	9.1	--
	<b>Secondary Unit</b>	2.3	2.8	4.0	5.7	9.1	11.0	15.0	24.0	-
<b>VD</b>	<b>Primary Unit</b>	0.6	0.6	1.1	1.7	2.8	4.0	5.7	9.1	11.4

The above oil quantities are approximate as improvements in design are continually being made. This specification is not to be regarded as binding in

**TROUBLE SHOOTING CHART**

SYMPTOM	TYPICAL CAUSES																	
	Lubricant			Oilseal Lip		Clogging of	Play	Improper	Backlash		Environmental			Alignment	Operational			
	Unsuitable	Insufficient	Overfilling	Hardened	Damaged	Breather	Excess	Less	Contact	More	Less	Dust	Heat		Chemical	Overload	Vibration	High Speed
Oilseal Leakage	*		*	*	*	*						*	*	*				*
Noise	*	*					*		*	*								*
Over Heating	*	*	*			*		*	*		*	*			*			*
Bearing Failure	*	*					*	*						*	*			*
Wormwheel Worn Out	*	*						*	*		*				*			
Joint Leakage	*		*			*						*				*		
Oil Oozing out through Ventilator	*		*			*												*
Oil Leakage through			*															

Special points to be observed : • Use of correct grade of oil • Fill oil to the correct level • Change oil periodically • Check alignment of Input and Output